

TRACE

PROJECT HIGHLIGHTS

Announcement of Opportunity	AO-OSSA-2-88
NASA Headquarters Office	
Enterprise	
Project	Transition And Coronal Explorer (TRACE)
Project Lead Center	GSFC
Management Approach	In-House
Mission Life (months)	12
Additional Data Analysis (months)	0
Launch Date	01 Apr 1998

MISSION OBJECTIVES

The primary objective of the TRACE science investigation is to explore in detail the connection between the fine scale magnetic field observed at the solar surface and the effects of the field observed in the photosphere, chromosphere, transition region and corona at a spatial scale of one arc second with excellent temporal resolution (seconds) and continuity (months). Elements key to accomplishing this include: EUV/UV channels on the same mirrors for perfect coalignment; sun-synchronous orbit to obtain months of continuous observing; image stabilization and guidance systems working together; "modern" data collection, storage, and transmission systems; and, coordination with SOHO, whose EOF is also at GSFC.

FOREIGN PARTICIPATION

None

SPACECRAFT DESCRIPTION

The TRACE spacecraft supports the TRACE instrument and spacecraft hardware. The instrument penetrates through the spacecraft and is attached to the top and bottom base plates of the spacecraft. The bottom of the spacecraft connects to the Pegasus XL launch vehicle attached fitting. The mechanical subsystem supports and carries the instrument and subsystem components. The primary structure consists of a thrust tube with four shear panels radially attached. The spacecraft subsystems consist of the following: the electrical and electronic, power and electronics, solar arrays, attitude control and thermal control and communications and data handling.

PAYLOAD DESCRIPTION

TRACE is a small explorer mission designed to study the evolution and propagation of events in the solar atmosphere from the solar surface through the photosphere, chromosphere, and transition region into the corona. The instrument consists of a 30-cm diameter telescope with different wavelength selective coatings on the primary and secondary and a filter wheel to select temperatures ranges from 6,000 to 2,500,000 degrees K. TRACE will operate in close coordination with the ESA/NASA Solar And Heliospheric Observatory (SOHO).

INSTRUMENT DESCRIPTIONS AND SCIENCE LEADERS

Data Point Number 808: The UV Telescope instrument (UV T) [protoflight] (TRACE) is a compact telescope with a guide telescope and charged coupled device (CCD) camera. The instrument is mounted on the spacecraft and is thermally isolated. The TRACE instrument is a Cassegrain, ultraviolet (UV) telescope with a 12-inch primary mirror and a 2-inch secondary mirror designed to study the transition region of the sun's atmosphere. The Cassegrain telescope is a cylinder with attachments. Attached to the main telescope are the guide telescope and CCD camera. The Guide telescope senses spacecraft pointing errors and creates signals to drive the secondary mirror. The CCD camera is an image detector. The image is transferred to the instrument data processing unit (DPU). Alan Title (Stanford Lockheed Institute for Space Research (SLISR)) is the instrument PI.

GROUND SYSTEM DESCRIPTION

The Wallops Flight Facility (WFF), a transportable ground station and the Madrid 26M will be the supporting elements for TRACE. During normal operations, WFF and Poker Flat will be the primary support. Support will be scheduled for dumping science and engineering data from the spacecraft onboard 88-Mbyte recorder, uplinking the daily stored command load. TRACE flight operations will be supported out of the SMEX Mission Operations Center (MOC) using the Integrated Test and Operating system (ITOS). The SMEX MOC will be the focal point for spacecraft mission operations with operations facilities shared among SMEX missions. The Flight Dynamics Division (FDD) will provide orbit determination, attitude determination and verification, mission analysis, acquisition data, and mission planning and scheduling. The Data Processing System (DPS) will receive instrument data from TRACE in real time (housekeeping data only) or through playback (science and housekeeping data) of the onboard recorder. The DPS will Level-0 process all data and will record, time order, and quality check the science data packets. The DPS will be located in the MOC.

CONTRACT AND SUBCONTRACT HISTORY

<u>Contractor/Subcontractor</u>	<u>Project Element</u>
New Mexico St. U.	ACS
Loral Conic	Transponder
Textron Defense Sys.	Gyros
Adcole Inc.	Coarse Sun Sensor
Adcole Inc.	Digital Sun Sensor
Techstar Inc.	Solar Array Panels
Hughes, Eagle Pitcher	Spacecraft Battery
Ithaco Inc.	Electromagnets
Stanford Lockheed Inst.	TRACE Instrument

LAUNCH AND MISSION ORBIT DATA

Launch Vehicle/Upper Stage	Pegasus XL	Inclination (deg)	
Launch Site	Western Range	Period (min)	
Mission Orbit Type	Sun synchronous	Perigee (km)	600
		Apogee (km)	650